Population Survey of the Oyster *Crassostrea virginica* in the Dunk River Estuary, Prince Edward Island, 1974

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POPULATION SURVEY OF THE OYSTER *CRASSOSTREA VIRGINICA* IN THE DUNK RIVER ESTUARY, PRINCE EDWARD ISLAND, 1974

by

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ABSTRACT

Hawkins, C.M. and T.W. Rowell. 1985. Population survey of the oyster Crassostrea virginica in the Dunk River Estuary, Prince Edward Island, 1974. Can. MS Rep. Fish. Aquat. Sci. 1860: iv + 66 p.

This report is the fourth in a series of seven which examine temporal changes in the oyster population of the Dunk River Estuary, Prince Edward Island. The report tabularizes and graphically presents information on the distribution, abundance, size, and age composition of oysters collected in 1974. Oyster density over the survey area ranged from 0-408 m^{-2}. Fourty-four percent of the sampling stations yielded oysters, 1 yr olds representing 45.0% of the population being most abundant. Two, 3, and 4 yr old and older oysters accounted for 29.2%, 6.5%, and 19.3% of the sampled population respectively. Size frequency histograms for individual stations indicated that spatfall settlement and survival was more regular in the principal fishing areas than in other areas of the Estuary.

RÉSUMÉ

Hawkins, C.M. and T.W. Rowell. 1985. Population survey of the oyster Crassostrea virginica in the Dunk River Estuary, Prince Edward Island, 1974. Can. MS Rep. Fish. Aquat. Sci. 1860: iv + 66 p.

Le présent document est le quatrième d'une série de sept rapports portant sur les changements temporels qui touchent la population d'huîtres dans l'estuaire dans la rivière Dunk, Île-du-Prince-Édouard. Le rapport présente des renseignements sous forme de tableaux et de graphiques concernant la distribution, l'abondance, la taille et l'âge des huîtres capturées en 1974. La densité des huîtres dans la région étudiée a variée de 0 à 408 par m^2. Des huîtres ont été capturées dans 44% des stations d'échantillonnage. Les huîtres âgées d'un an étaient les plus abondantes; elles représentaient 45,0% de la population. Les huîtres âgées de deux, trois et quatre ans et plus représentaient respectivement 29,2%, 6,5% et 19,3% de la population échantillonnée. Les histogrammes de fréquences relatifs à la taille pour les différentes stations ont indiqué que la fixation des larves sur un support et la survie étaient plus régulières dans les principales zones de pêche que dans les autres zones de l'estuaire.

INTRODUCTION

This report is the fourth in a series of seven which examine the population structure of Crassostrea virginica in the Dunk River Estuary, Prince Edward Island. This long-term monitoring program, begun in the summer of 1969, yielded detailed information on the distribution, abundance, and size composition of oysters in the Estuary. The information which follows summarize data collected during August 1974.

MATERIALS AND METHODS

Field sampling was carried out during August 3-9, 1973. Hawkins and Rowell (1985a) provide a detailed description of the study site, sampling procedure, and methods of data acquisition and collation. Figure 1 presents the locations of 14 transects and their respective stations in the Dunk River Estuary. A total of 131 stations were sampled.

RESULTS AND DISCUSSION

Table 1 lists each transect with its respective sampling stations, oyster density per square meter, fresh weight (kilograms per square meter), range, mean size (in centimeters), and standard deviation of live oysters collected. The weight of shell collected at each station is shown in Figure 2. Weight of loose shell material ranged from 0-2.4 kg m^{-2}. In only 2.3% of the 131 stations examined did the loose shell material account for more than 2.0 kg of the total weight of material collected. Density per square meter of live oysters at each station is presented in Figure 3 and ranged from 0-408 individuals m^{-2}. Fifty-six percent of all stations yielded no live oysters. All transects except F (Stations 55-58), H (Station 63-66), and N (Stations 124-131) had oysters.

Following the classification of oyster density adopted by Lavoie (1977) we found that 74.8% of the 131 stations examined had low densities (≤10 m^{-2}), 21.4% had intermediate densities (11-100 m^{-2}), and 3.8% had high densities (>100 m^{-2}). The percentage of stations with low densities had increased from 41.2% observed in the previous year (Hawkins and Rowell 1985c), and a value for intermediate-density areas had decreased from 43.1% in 1973 to 21.4% in 1974. In addition, the percentage of stations with high densities in 1973 (15.7%) had decreased to only 3.8% by 1974. Lavoie (1977) indicated that areas of intermediate oyster density are preferred by fishermen, since these areas yield good-quality oysters while requiring little culling effort. While this consideration may be significant in a market-direct fishery, it does not apply to the same degree in a relay fishery, such as that in the Dunk River, where the cull size is smaller. Density information based on size (length) and age is more useful in determining oyster availability to the fishery and in following recruitment patterns.

Figures 4a, b, c, and d present the numerical density of 1, 2, 3, and 4+ yr old oysters at each station. Ages were approximated, based on the growth equation established by Lavoie and Bryan (1981) for Dunk River oysters. Figures 5a, b, c, and d present the same data as a percentage of the total number of oysters collected at each sampling station. Approximately 21% (522 individuals) of the total number of oysters collected

in the survey (2,400 individuals) were equal to or greater than 2.5 inches (6.5 cm), the cull size for the relay fishery, while about 13% (310 individuals) were equal to or greater than the legal minimum size for market oysters, 3 inches (7.6 cm). Figure 5a shows that 1 yr old oysters (≤2.5 cm) comprise over 25% of the oysters collected in 23.7% (31 of 131 stations) of the total number of stations examined. Figure 5b indicates that 2 yr old oysters (2.6-4.5 cm) made up between 26-100% of the oysters collected in 24.4% of the total number of stations occupied. Other ages were less abundant and did not predominate in as large a percentage on the stations examined.

Size frequency distributions were calculated for each station with more than 10 individuals m^{-2} (Fig. 6). Lower densities were not considered representative of populations within a 1 m^2 quadrat. Size frequency distributions for individual stations within two principal fishing areas indicate that these areas receive more regular spatfall settlement and probably have better rates of survival than do other areas within the Estuary. This is revealed in part by the wide size range of oysters in each of the two areas (Stations 96, 98, 99, 69, 71 to 74, 82, and 86) combined with similar patterns in the overall size frequency distributions among stations within each area. Areas outside the main fishing regions exhibit markedly irregular patterns in both the overall size frequency distributions among stations and the range of sizes of oysters at each station.

Examination of Figure 7, a composite size frequency distribution constructed from all available data, provides a means of comparing the 1974 population size structure with those of previous and subsequent years. The population size structure for 1974 shows a bimodal distribution pattern with 1 and 2 yr old oysters together (≤2.5-4.5 cm) comprising 74.1% of the total sampled population and 3 and 4+ yr old oysters together(4.6->6.5 cm) comprising the remaining 25.9% of the sampled population. The high proportion of 1 and 2 yr old oysters may be indicative of good spatfall settlement and survival in 1973 as well as good survival of the 1972 year class (Hawkins and Rowell 1985b, and c). In contrast the 1973 survey had indicated a very low percentage (4.1%) of 1 yr old oysters, suggesting poor settlement and (or) survival of the 1972 year class. While the cause of this descrepancy cannot be determined, it may have resulted from a selection of stations in 1973 which were outside the principal areas of spat settlement in 1972.

The 1974 population shows two prominent modes, as do the populations seen subsequently in 1975-1977. The frequency value calculated for the largest mode in the 1974 distribution is among the highest when compared to other years.

The weight of material collected at each station is given in the Appendix. Generally, the weight of loose shell and live oysters comprised the major proportion of the total sample weight.

SUMMARY

1. Weight of loose shell material collected at individual stations ranged from 0-2.6 kg.

2. Loose shell and live oysters accounted for the major proportion of the total sample weight at each station.

3. Oyster density ranged from 0-408 individuals m^{-2} over all stations, 74.8% of the stations having low densities ($\leq 10\ m^{-2}$), 21.4% having intermediate densities (11-100 m^{-2}), and 3.8% having high densities ($>100\ m^{-2}$).

4. Size frequency distributions indicated that in the principal fishing areas, spatfall settlement and survival were more regular than in other areas of the Estuary.

5. A size frequency distribution for all stations indicated a bimodal distribution pattern with 1 and 2 yr old oysters together accounting for 74.2% of the population, 1 yr olds representing 45.0%, and 2 yr olds 29.2%. Three and 4+ yr olds accounted for 6.5% and 19.3% respectively.

6. The high percentage of 1 yr old oysters suggests very good spat settlement and survival of the 1973 year class.

7. The good representation of the 1972 year class (29.2%) is at variance with observations in the previous year's (1973) survey when, as 1 yr olds, this year class was very poorly represented (4.1%). Sampling error, resulting from differences in sampling station location between the 2 yr, appears the most likely cause of this variance.

ACKNOWLEDGEMENTS

We wish to thank R.E. Lavoie for planning and implementing the survey and C.F. Bryan for his assistance in collection and processing field samples. B. Mullen and D. Whillans assisted in data processing and graphic presentation.

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Table 1. Density per square meter, range of 0.5 cm size classes, mean size (in centimeters), standard deviation, and fresh weight (in kilograms) of oysters collected at each station in 1974.

Transect line	Station number	Number m^{-2}	Range of 0.4 cm size classes	Mean size (cm)	Standard deviation	Oyster weight (kg m^{-2})
A	1	3	2.0- 6.5	4.00	2.18	0.03
	2	10	1.5- 5.5	3.35	1.25	0.05
	3	3	3.0- 3.5	3.50	0.00	0.05
	4	1	6.5- 7.0	7.0		0.03
	5	12	2.5-10.0	4.56	2.51	0.38
	6	77	1.0-12.5	4.08	2.60	0.92
	7	0				
	8	0				
	9	8	1.5-10.5	6.94	2.76	0.21
	10	0				
	11	0				
	12	0				
B	13	0				
	14	22	1.0- 9.5	3.86	2.40	0.42
	15	2	2.0- 5.5	4.00	2.12	0.02
	16	1	7.0- 7.5	7.5		0.04
	17	0				
	18	0				
	19	0				
	20	22	1.5- 9.0	4.45	2.17	0.23
	21	162	0.5-12.0	3.57	2.33	0.77
	22	59	0.5- 9.5	3.29	1.83	0.29
	23	27	1.5-10.0	3.87	2.36	0.22
	24	2	6.5- 7.0	7.0	0.00	0.04
	25	0				
C	26	0				
	27	4	4.5- 8.0	7.00	1.35	0.14
	28	33	0.5-12.5	3.76	2.24	0.26
	29	17	2.0-12.5	4.97	3.40	0.38
	30	3	6.0- 8.5	7.83	1.15	0.14
	31	24	1.0-10.0	3.44	2.48	0.15
	32	0				
	33	45	1.0-12.5	3.73	2.36	0.43
	34	0				
	35	0				

...Cont'd.

Table 1. Cont'd.

Transect line	Station number	Number m^{-2}	Range of 0.5 cm size classes	Mean size (cm)	Standard deviation	Oyster weight (kg m^{-2})
D	36	0				
	37	0				
	38	21	1.5-10.5	5.33	3.12	0.45
	39	28	1.5-11.5	4.21	2.73	0.19
	40	48	1.5- 8.5	3.46	1.62	0.25
	41	0				
	42	66	1.0-14.5	4.62	3.08	0.44
	43	5	2.0- 3.5	3.00	0.35	0.01
E	44	0				
	45	0				
	46	0				
	47	0				
	48	15	2.0- 9.5	5.20	2.82	0.30
	49	4	3.0- 4.5	3.88	0.48	0.03
	50	0				
	51	0				
	52	7	2.5 -7.5	4.07	1.54	0.06
	53	0				
	54	0				
F	55	0				
	56	0				
	57	0				
	58	0				
G	59	0				
	60	0				
	61	1	2.0- 2.5	2.50		0.02
	62	0				
H	63	0				
	64	0				
	65	0				
	66	0				
I	67	1	2.5- 3.0	3.00		0.01
	68	3	1.5- 3.5	2.67	0.76	0.01
	69	23	1.5-14.5	5.93	3.59	0.60

...Cont'd.

Table 1. Cont'd.

Transect line	Station number	Number m^{-2}	Range of 0.5 cm size classes	Mean size (cm)	Standard deviation	Oyster weight (kg m^{-2})
	70	0				
	71	61	1.0-14.5	6.31	3.05	1.81
	72	37	1.0- 9.0	4.22	2.35	0.60
	73	17	0.0- 9.5	5.21	2.94	0.32
	74	324	1.0-11.0	3.68	2.41	0.83
	75	0				
	76	0				
	77	0				
	78	0				
J	79	16	1.0-11.0	4.56	4.01	0.22
	80	0				
	81	9	2.0-13.5	6.67	3.89	0.30
	82	42	1.0-10.0	4.92	2.82	0.85
	83	80	1.0-10.5	3.38	2.17	0.84
	84	0				
	85	0				
	86	123	1.0- 8.5	3.67	2.27	0.80
	87	8	1.0- 8.0	5.38	2.72	0.18
	88	0				
	89	0				
	90	0				
K	91	0				
	92	5	1.0-10.5	3.70	3.83	0.06
	93	7	1.5- 7.5	5.00	2.42	0.16
	94	4	7.0-11.0	9.75	1.66	0.38
	95	6	1.5- 8.0	4.50	2.76	0.15
	96	100	1.0-10.5	3.98	2.58	0.83
	97	0				
	98	280	0.5-11.5	3.74	2.42	1.47
	99	408	1.0- 9.5	3.10	1.85	0.75
	100	0				
	101	0				
L	102	0				
	103	68	1.0-15.5	6.78	4.54	1.40
	104	2	10.5-12.0	11.50	0.71	0.33
	105	0				
	106	0				
	107	8	1.5- 9.0	5.25	2.45	0.18

...Cont'd.

Table 1. Cont'd.

Transect Line	Station number	Number m^{-2}	Range of 0.5 cm size classes	Mean size (cm)	Standard deviation	Oyster weigth (kg m^{-2})
	108	13	1.5-12.5	4.77	3.03	0.32
	109	36	2.0- 8.5	5.42	1.99	0.01
	110	0				
	111	0				
	112	0				
M	113	0				
	114	0				
	115	0				
	116	25	0.5-10.5	3.62	2.54	0.40
	117	0				
	118	0				
	119	0				
	120	0				
	121	0				
	122	0				
	123	2	9.0- 9.5	9.5	0.00	0.15
N	124	0				
	125	0				
	126	0				
	127	0				
	128	0				
	129	0				
	130	0				
	131	0				

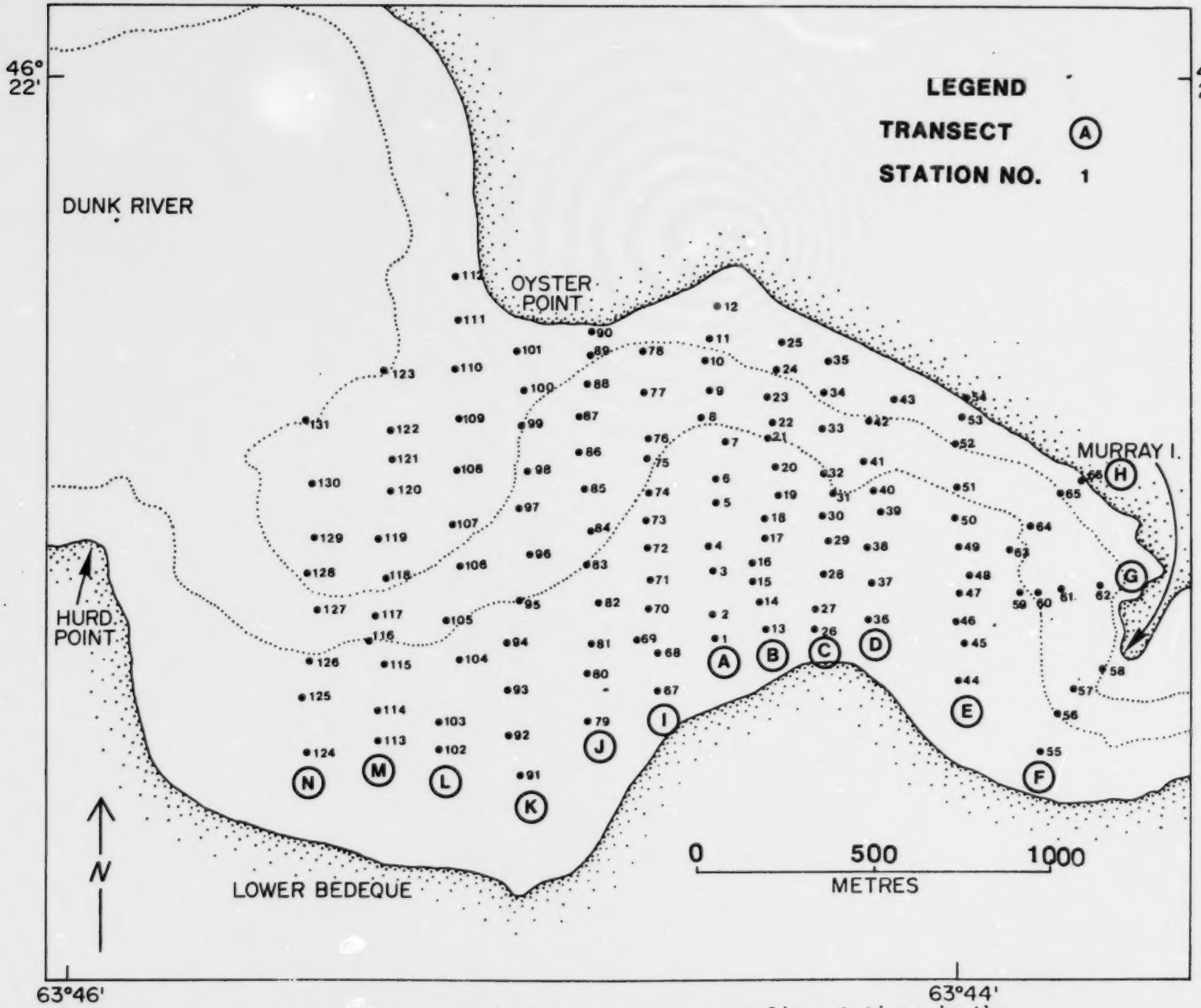

Figure 1. Positions of transects and their respective sampling stations in the Dunk River Estuary, 1974.

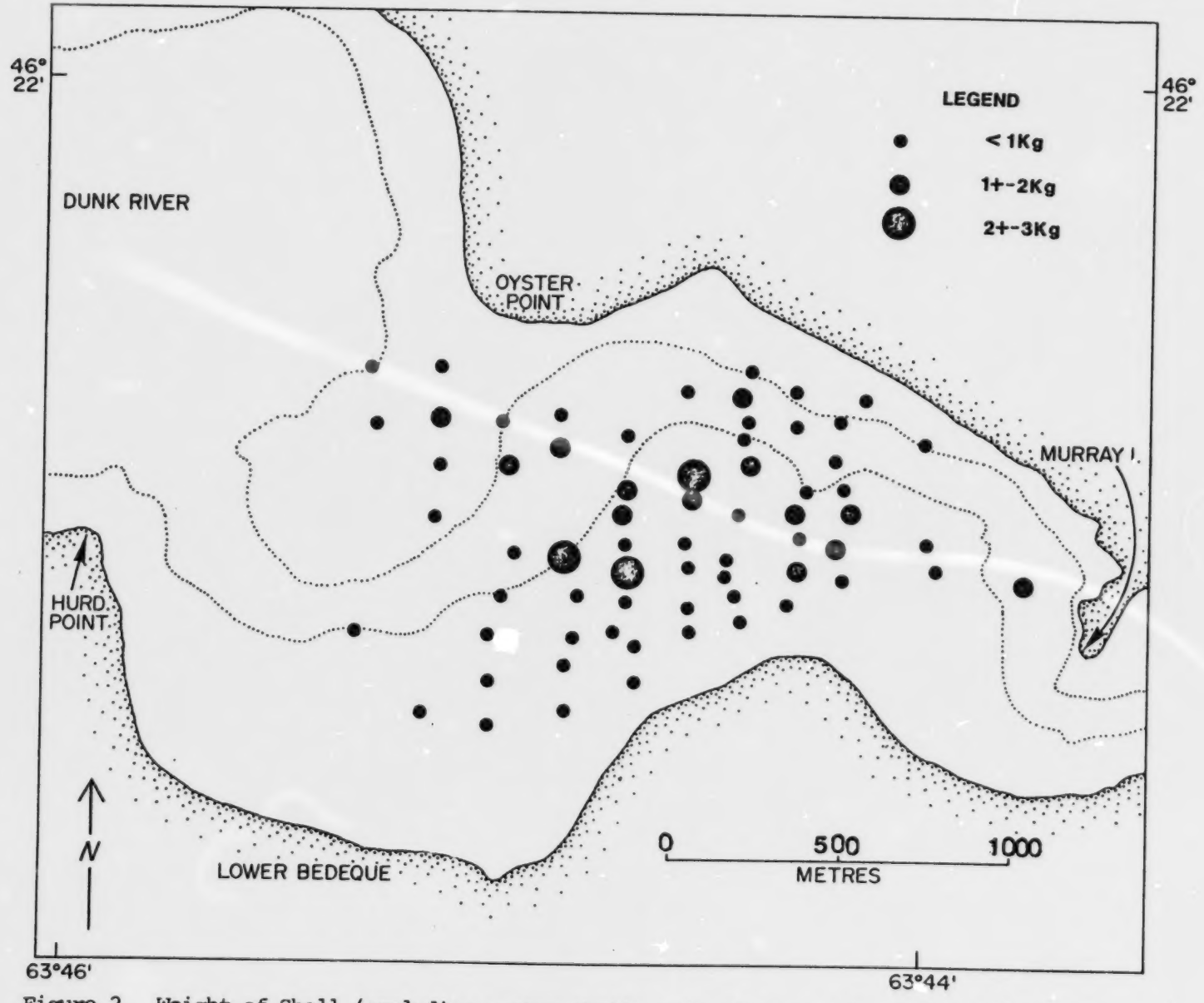

Figure 2. Weight of Shell (excluding oyster shell) collected at each station in 1974.

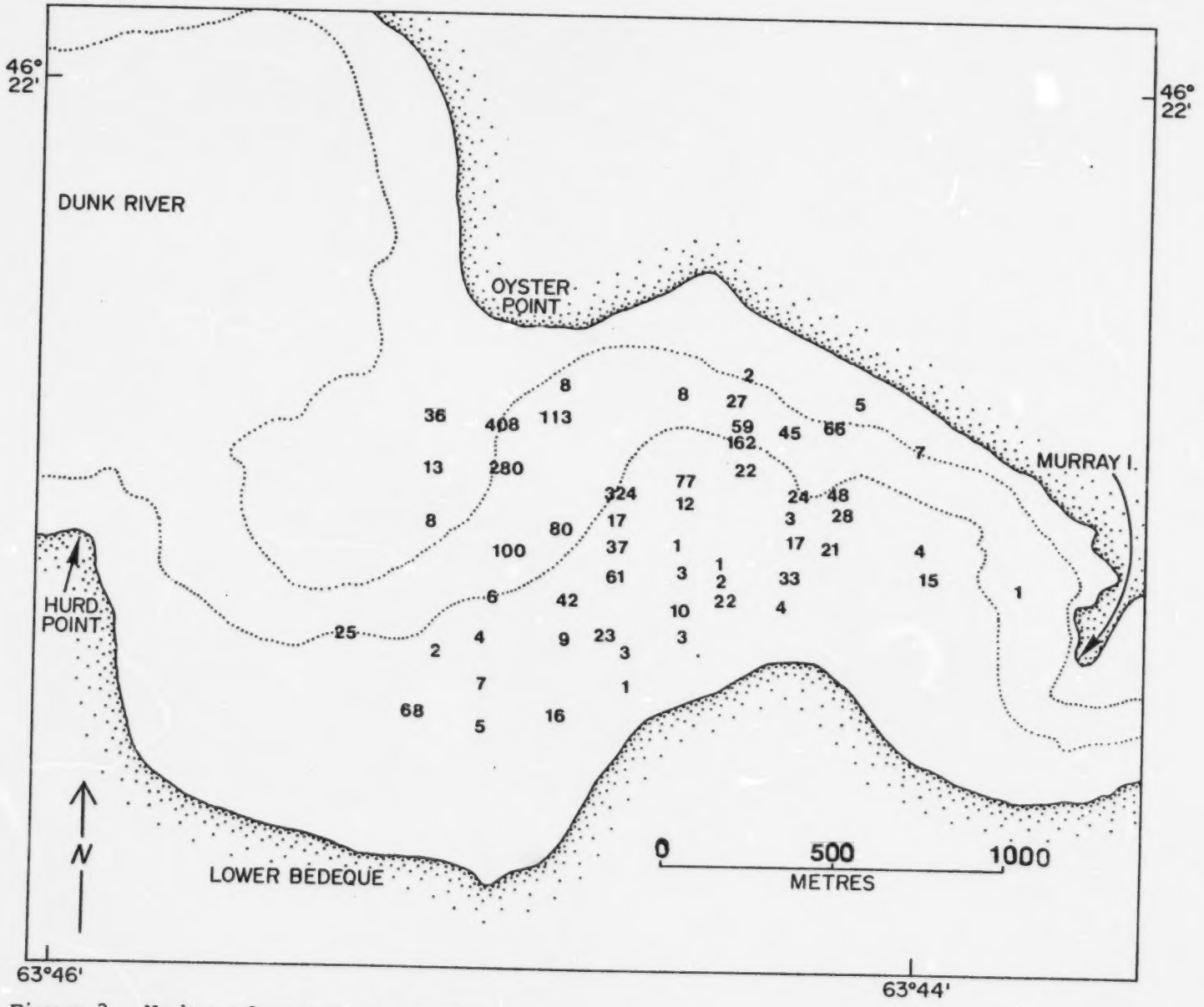

Figure 3. Number of oysters per square metre.

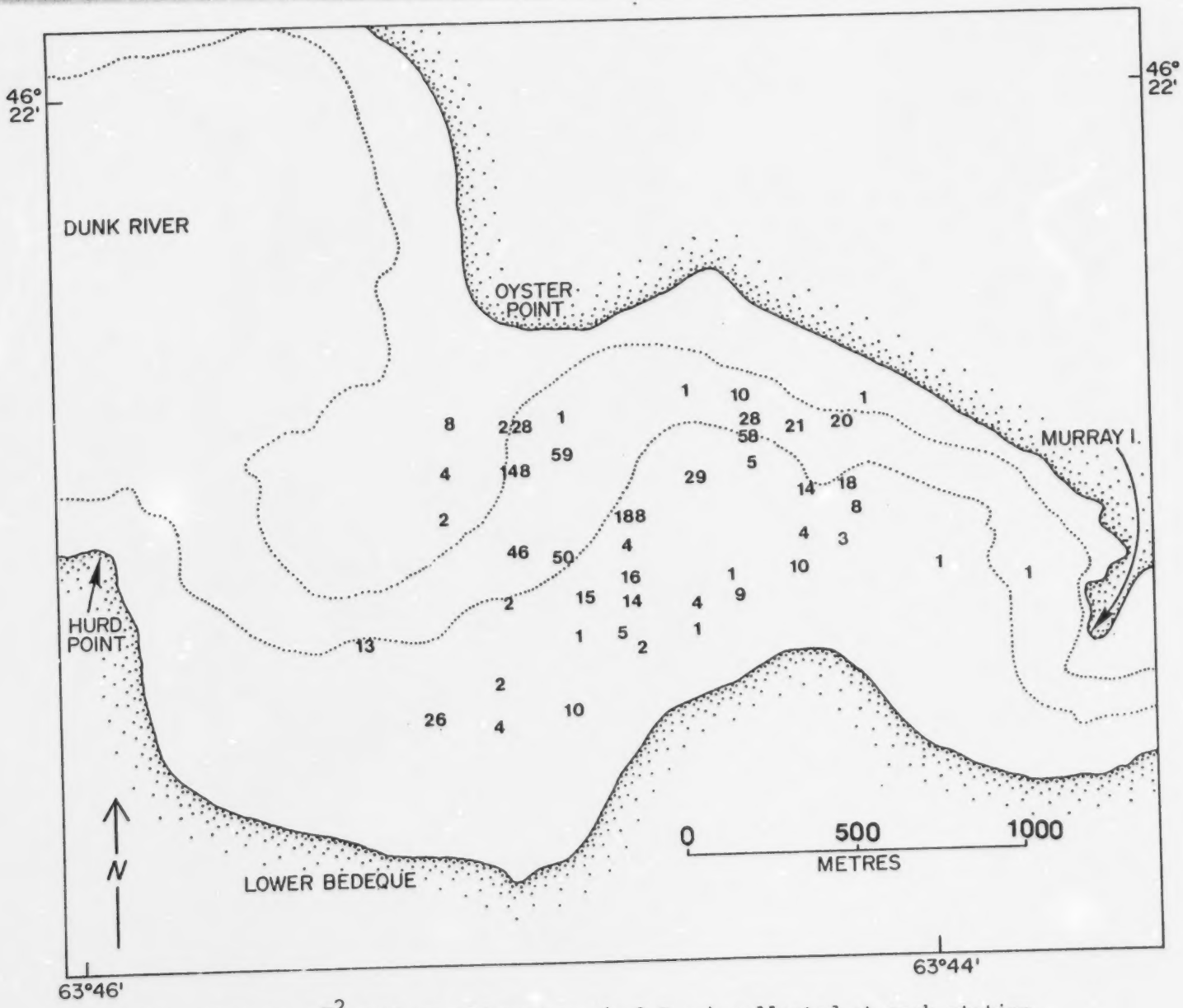

Figure 4a. Density m^{-2} of 1 yr old oysters ($\leq$ 2.5 cm) collected at each station.

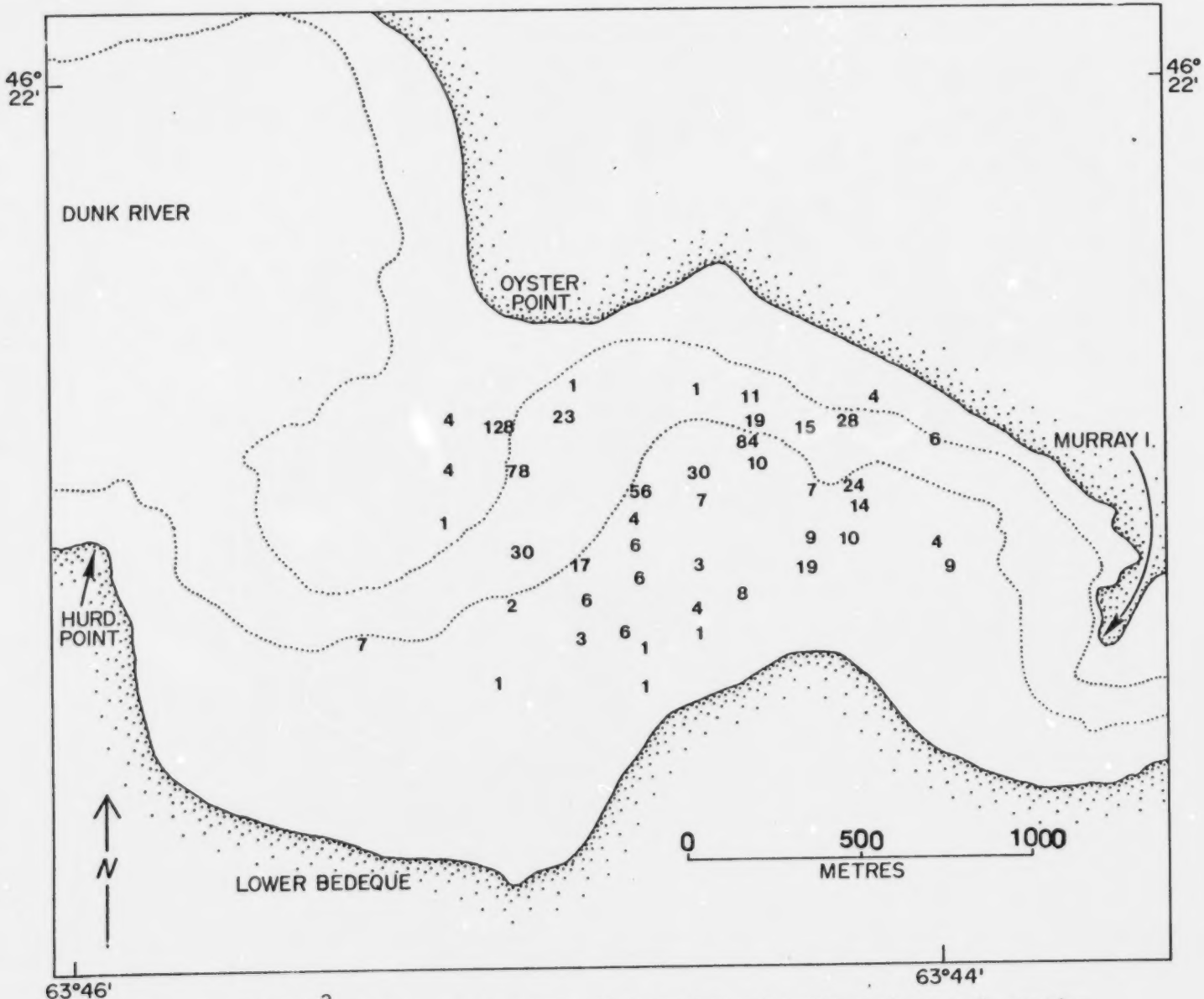

Figure 4b. Density m^{-2} of 2 yr old oysters (2.6 to 4.5 cm) collected at each station.

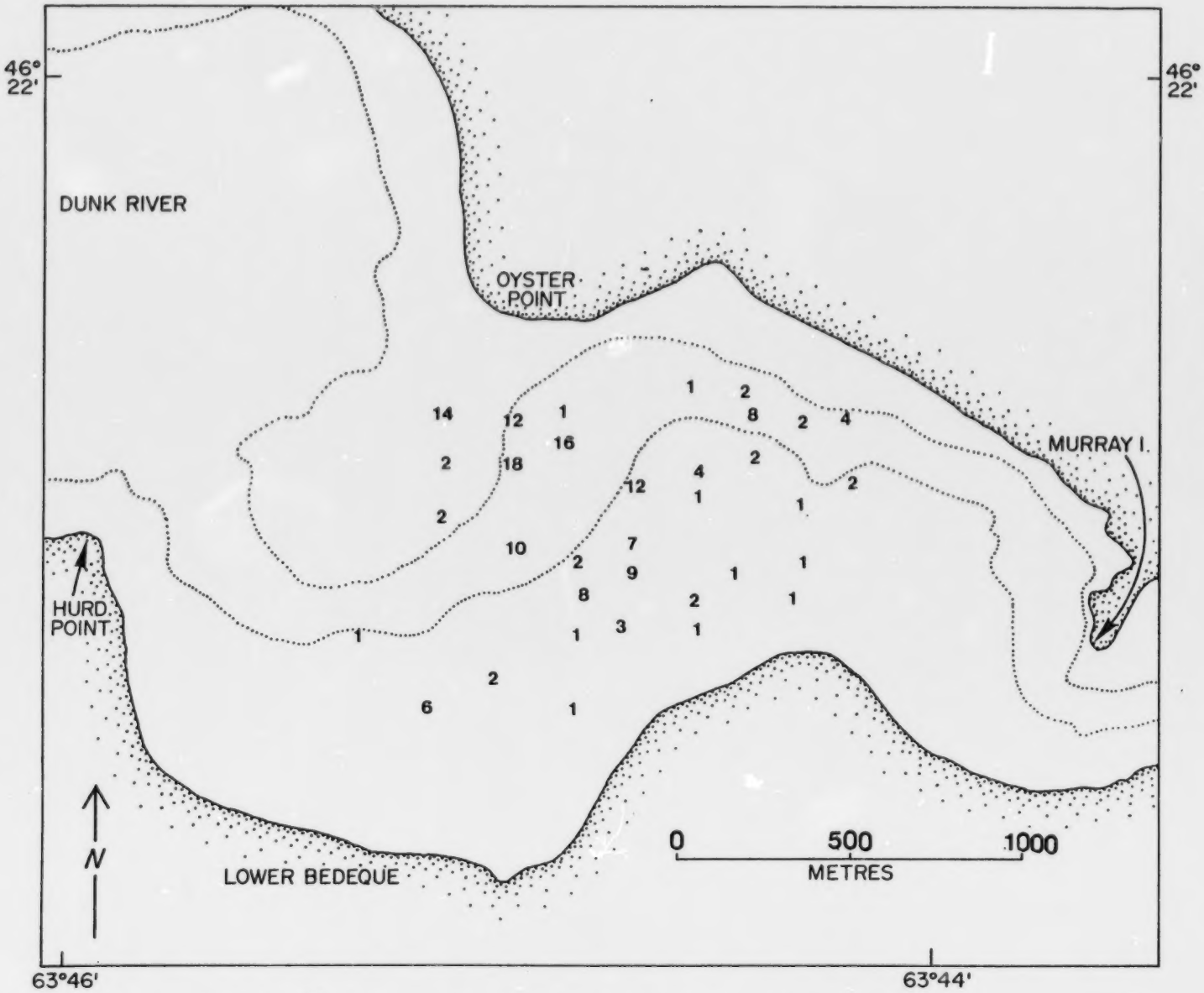

Figure 4c. Density m^{-2} of 3 yr old oysters (4.6 to 6.5) collected at each station.

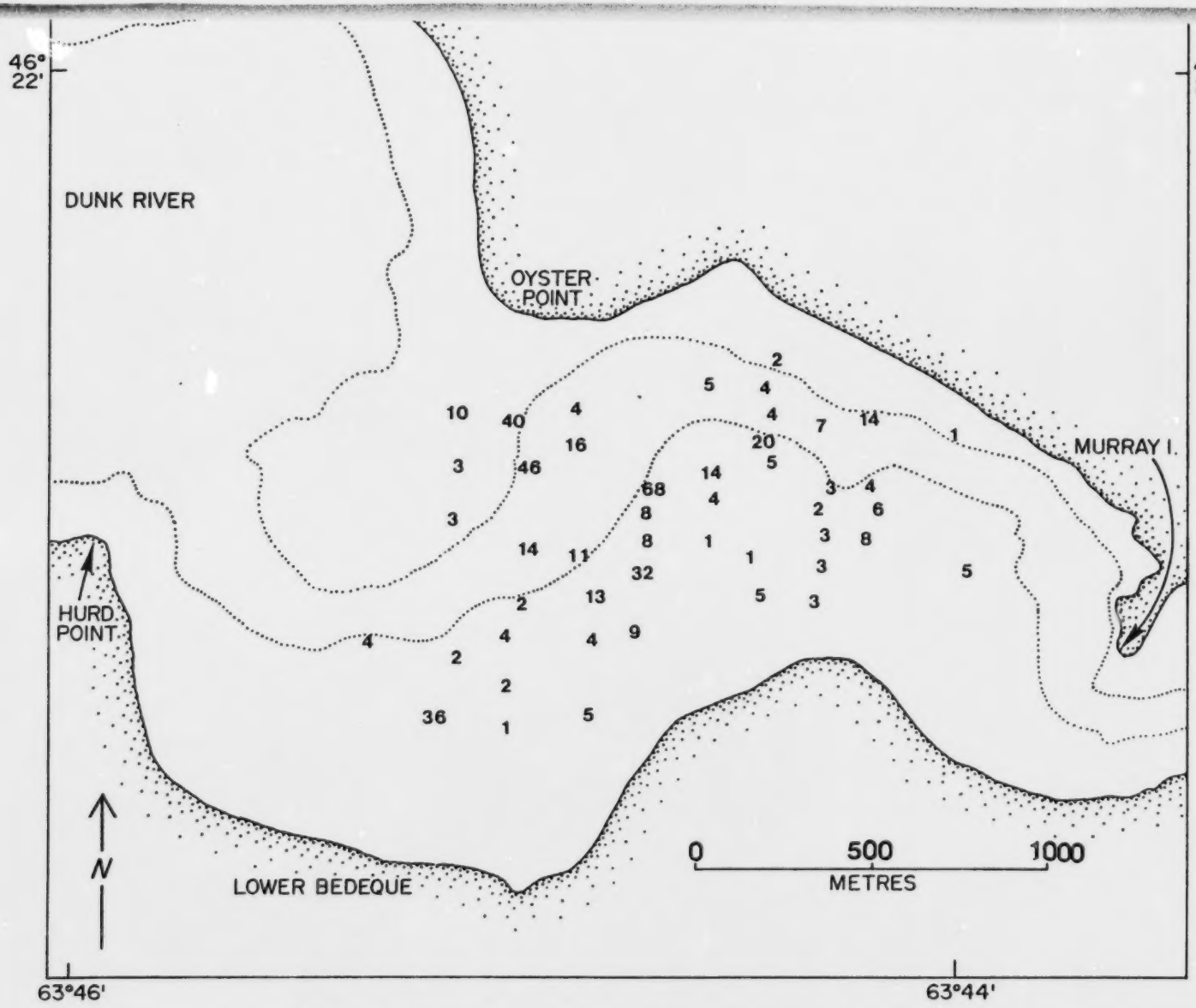

Figure 4d. Density m^{-2} of 4+ yr old oysters (>6.5 cm) collected at each station.

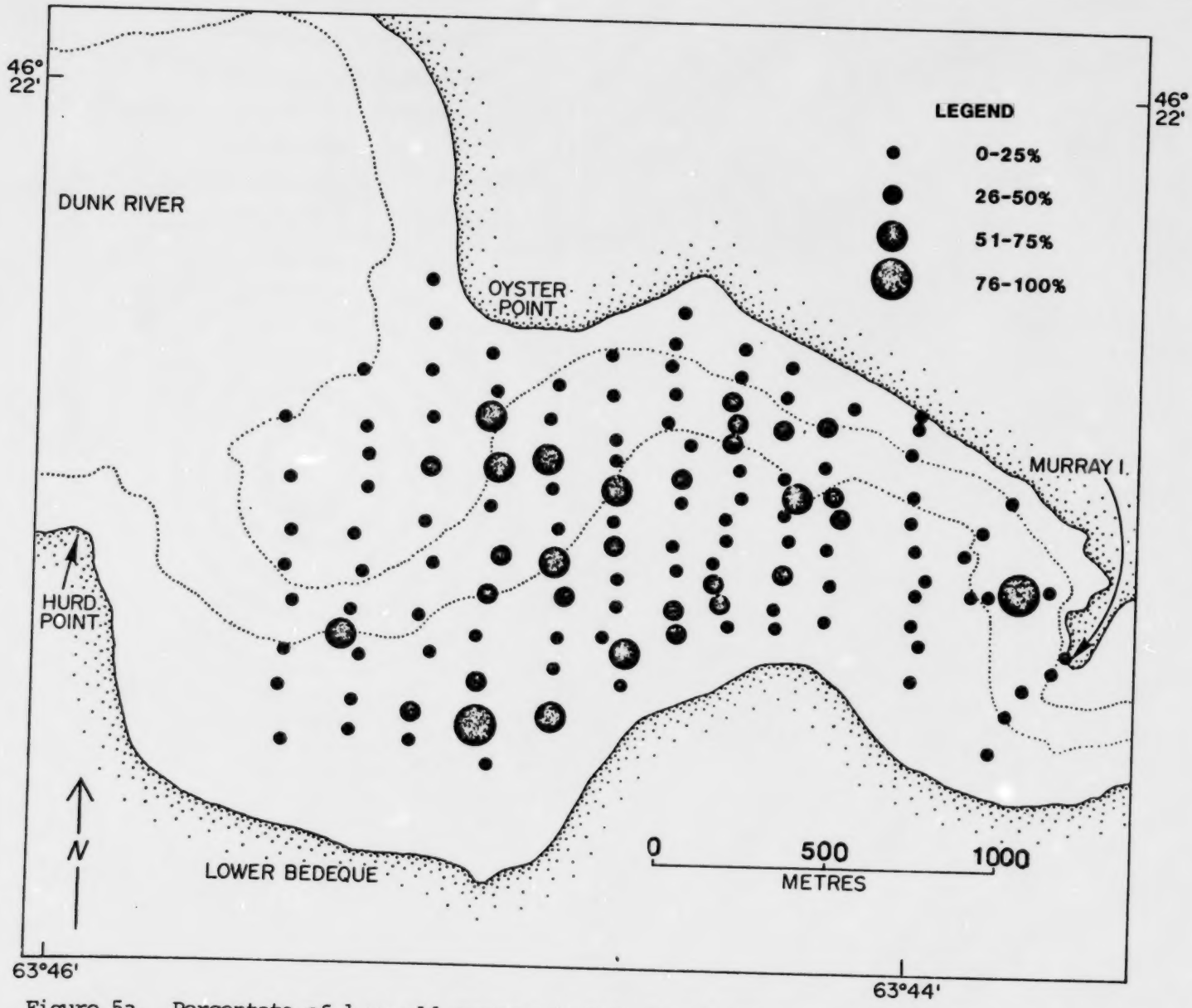

Figure 5a. Percentate of 1 yr old oysters (≤ 2.5 cm) collected at each station.

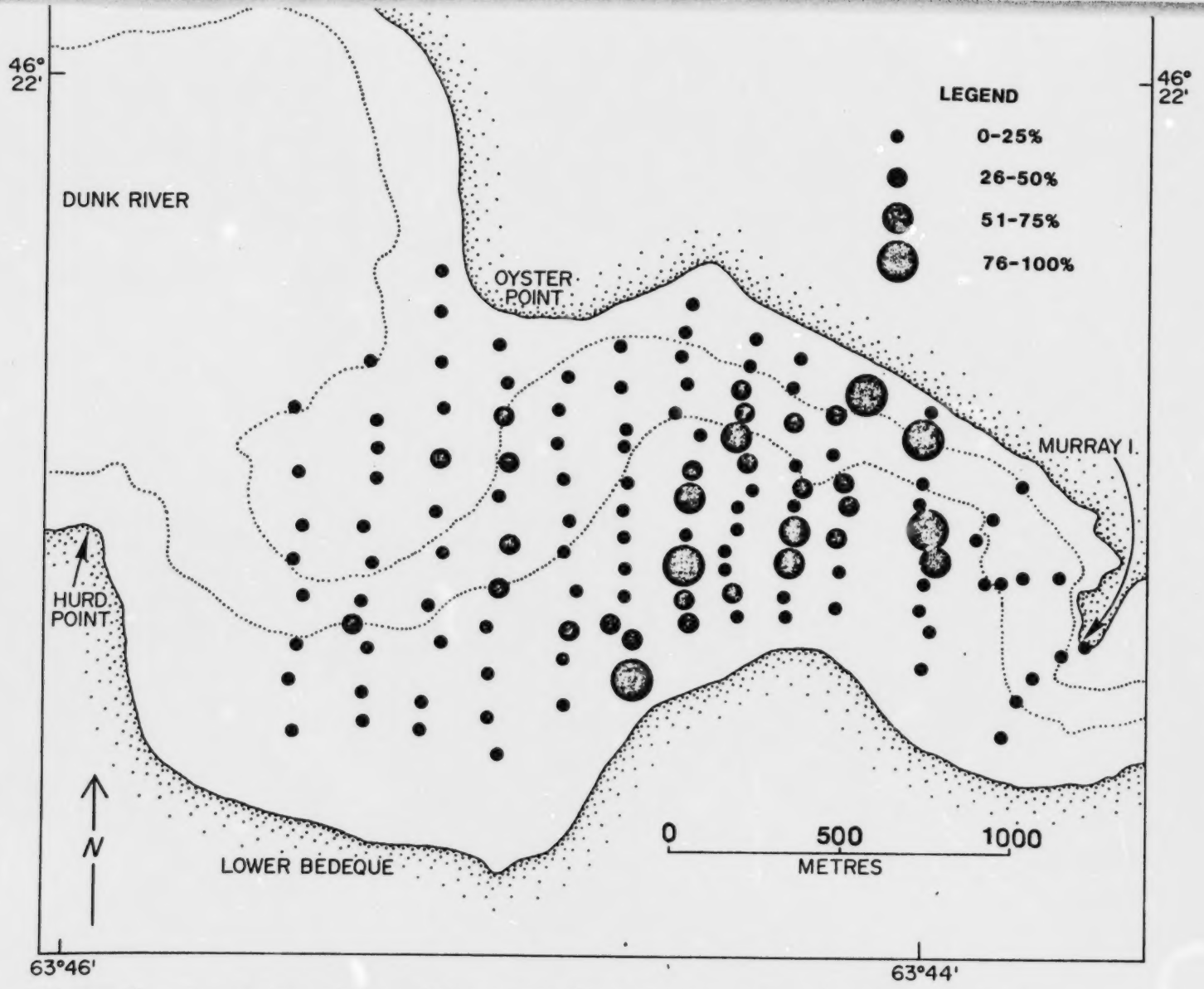

Figure 5b. Percentage of 2 yr old oysters (2.6 to 4.5 cm) collected at each station.

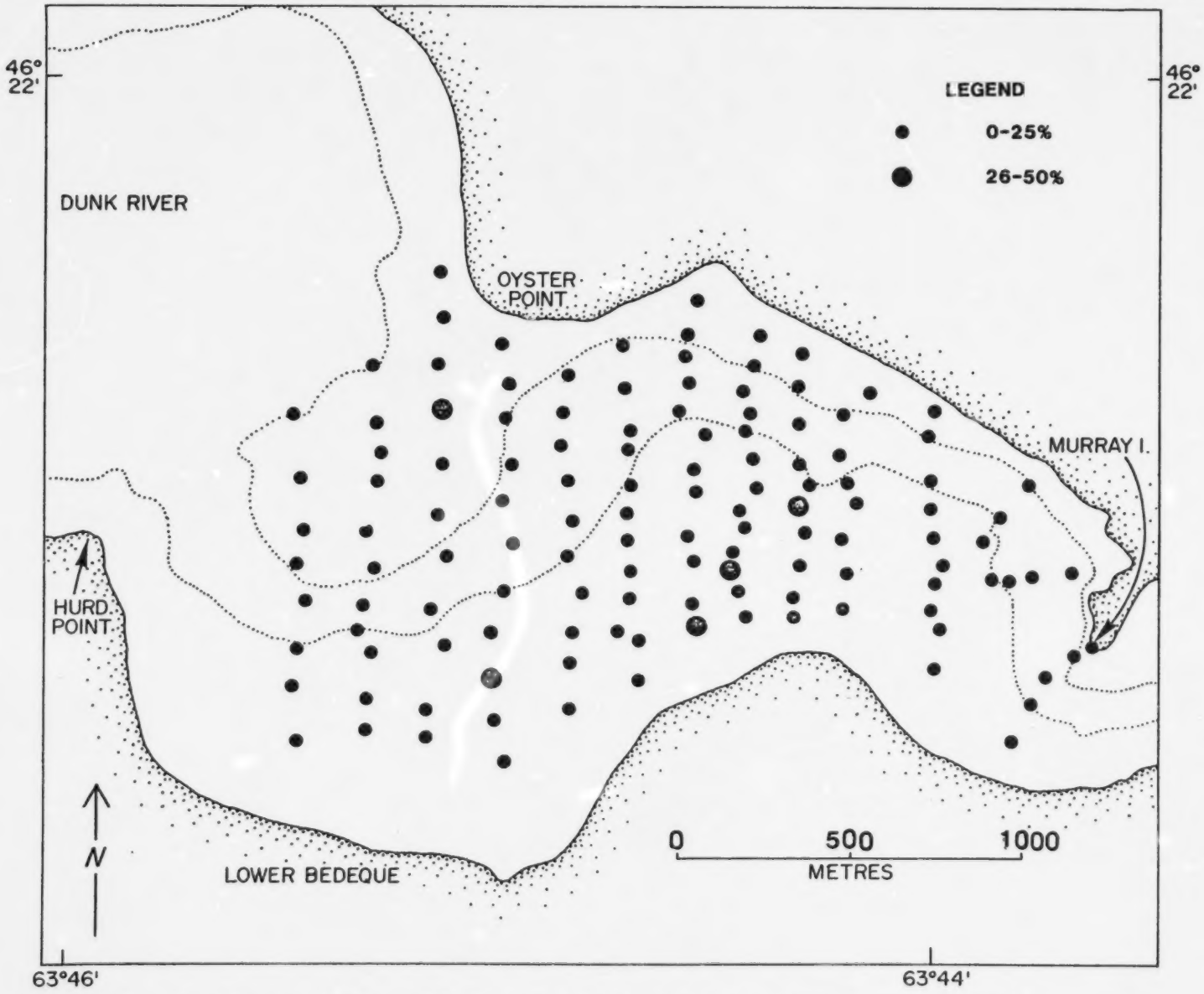

Figure 5c. Percentage of 3 yr old oysters (4.6 to 6.5 cm) collected at each station.

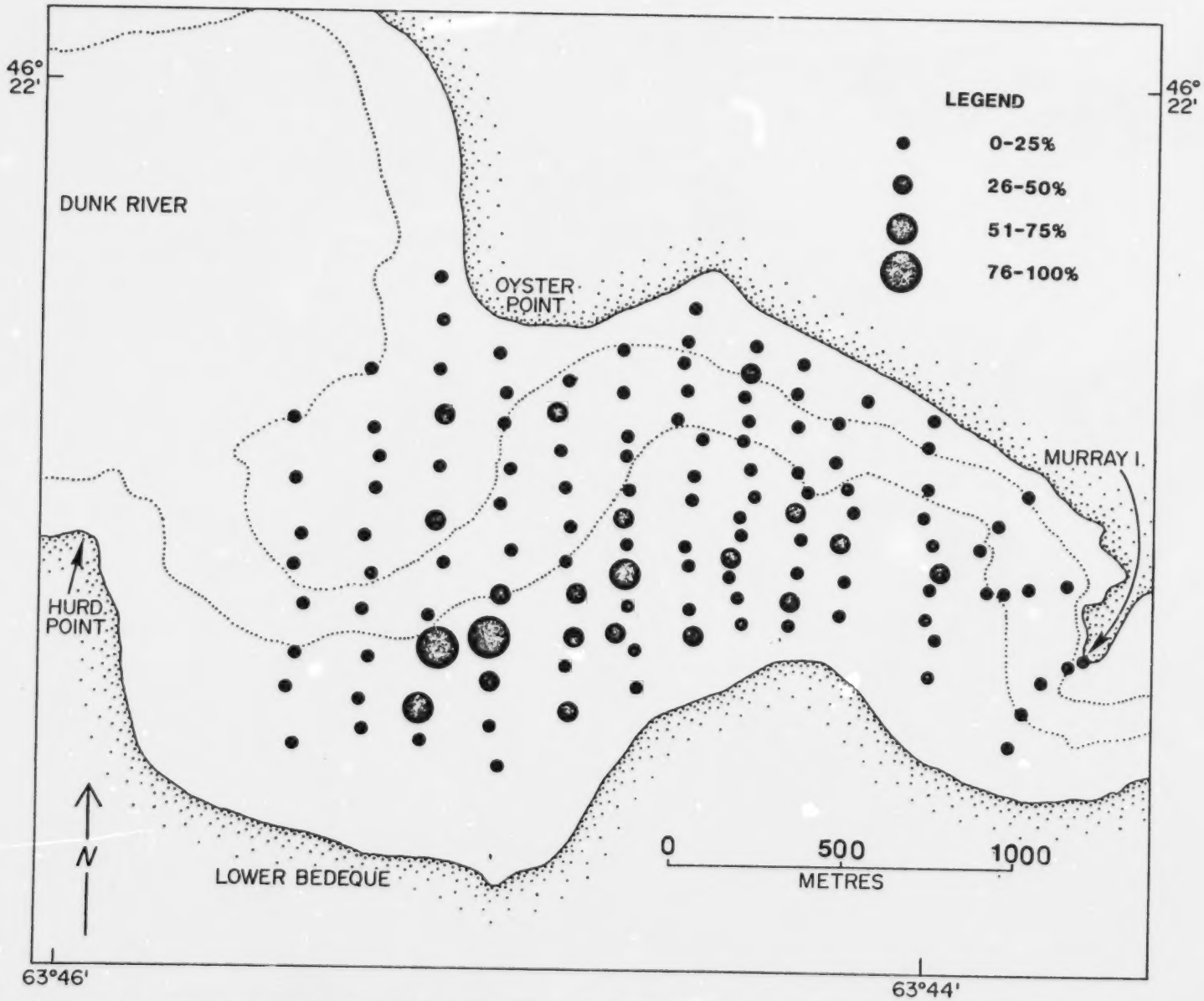

Figure 5d. Percentage of 4+ yr old oysters (>6.5 cm) collected at each station.

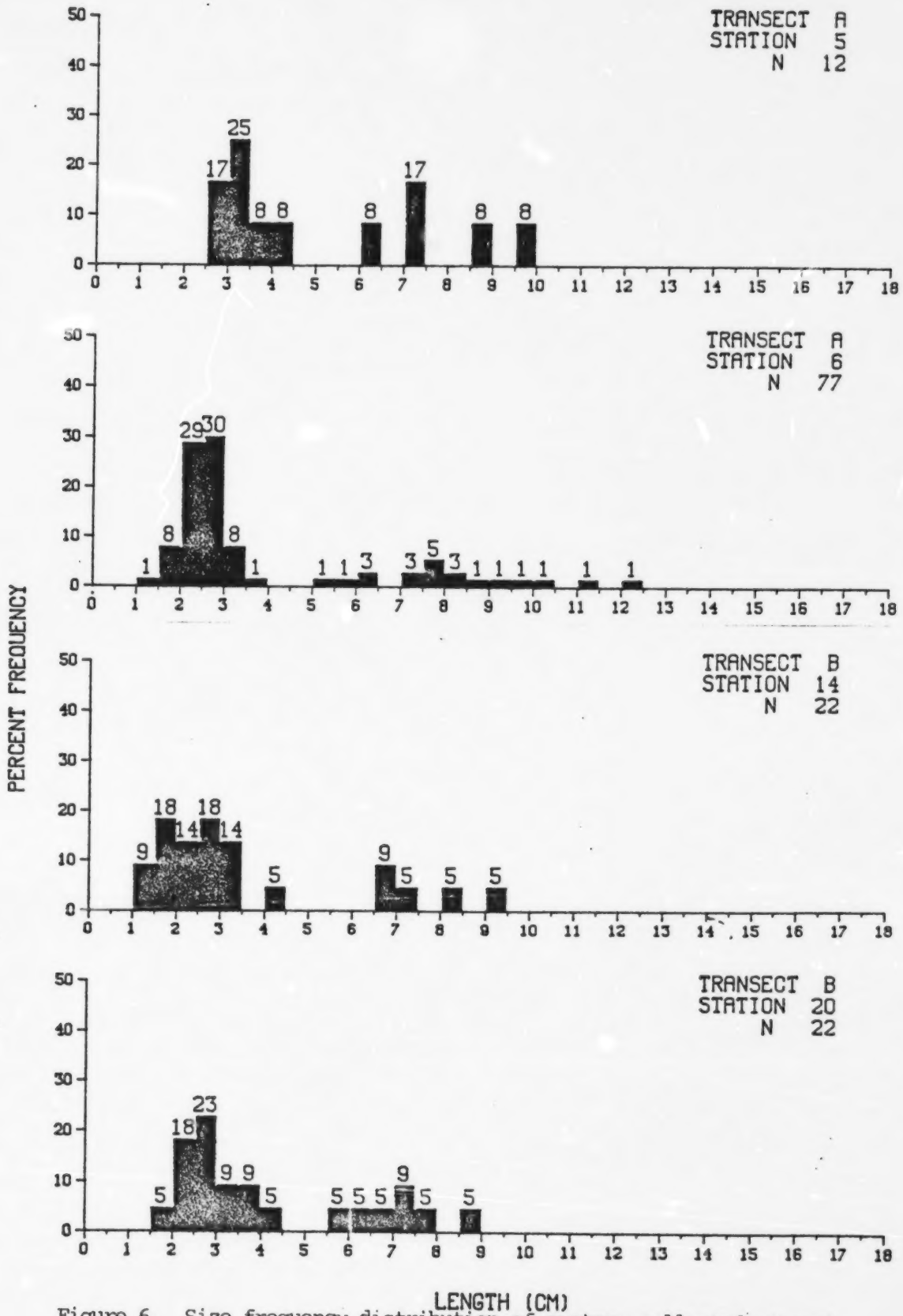

Figure 6. Size frequency distribution of oysters collected at each station in 1974. 1 yr olds < 2.5 cm in length, 2 yr olds 2.6-4.5 cm, 3 yr olds 4.6-6.5 cm and 4,+ yr olds >6.5 cm.

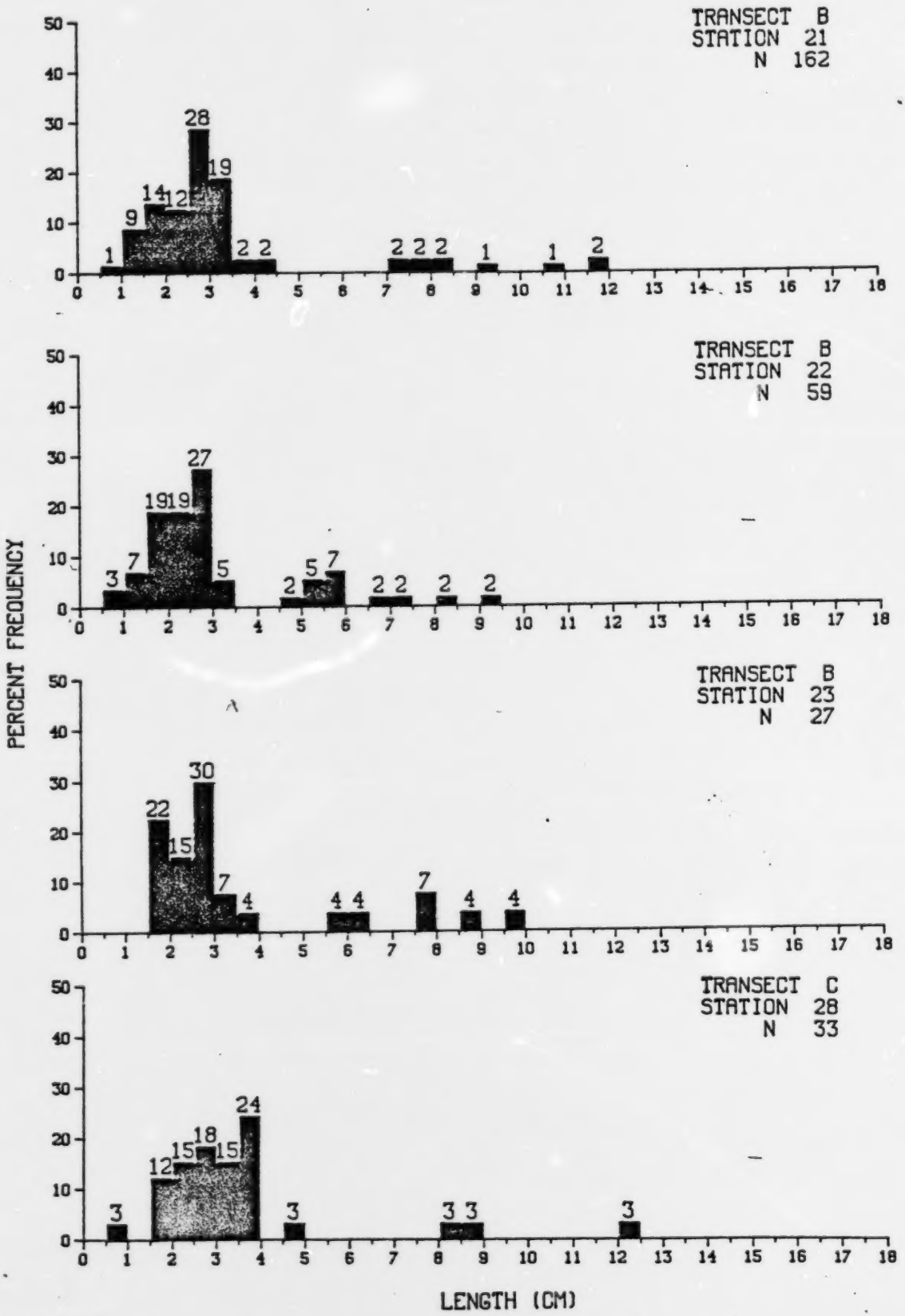

Figure 6.. Cont'd.

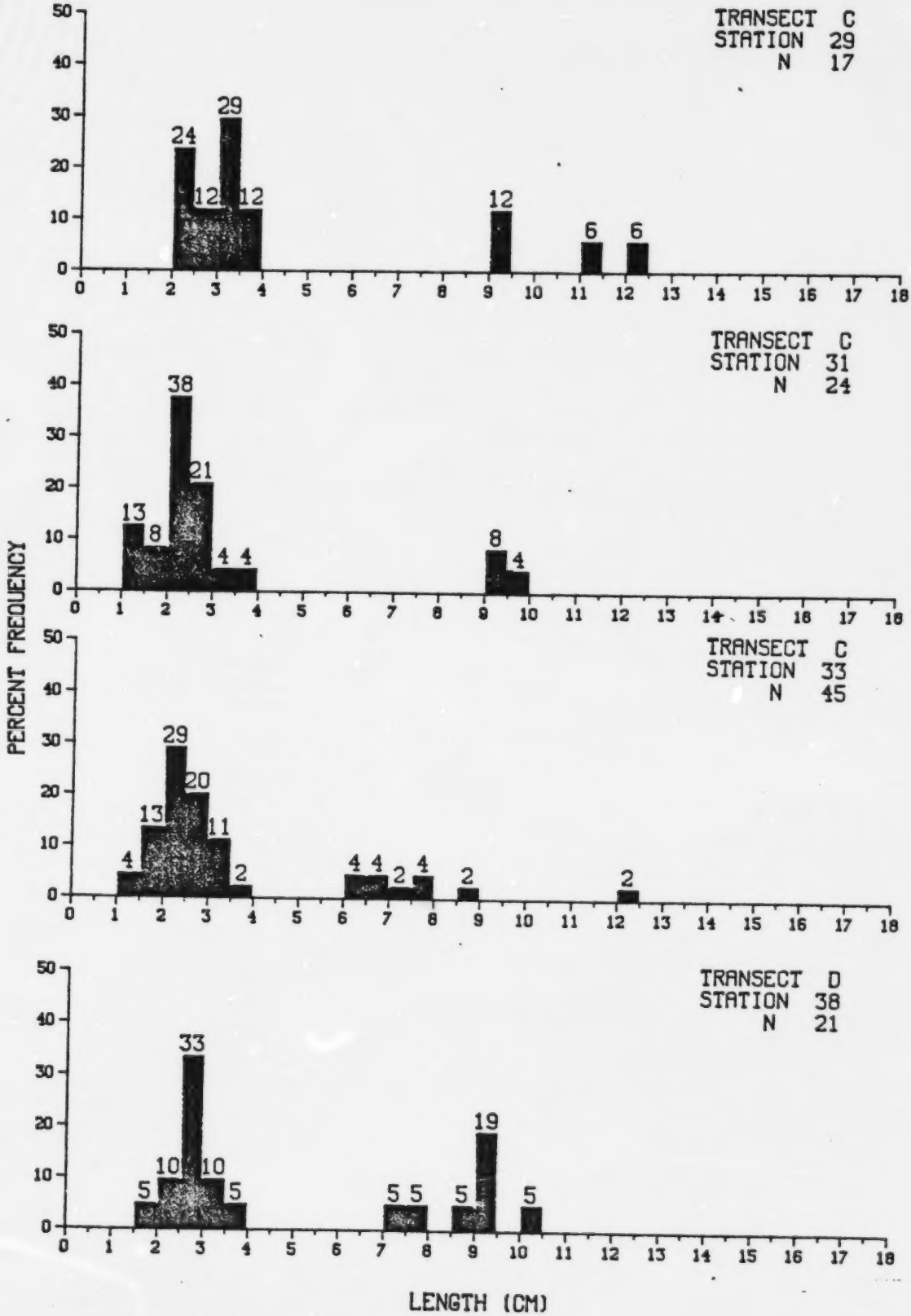

Figure 6. Cont'd.

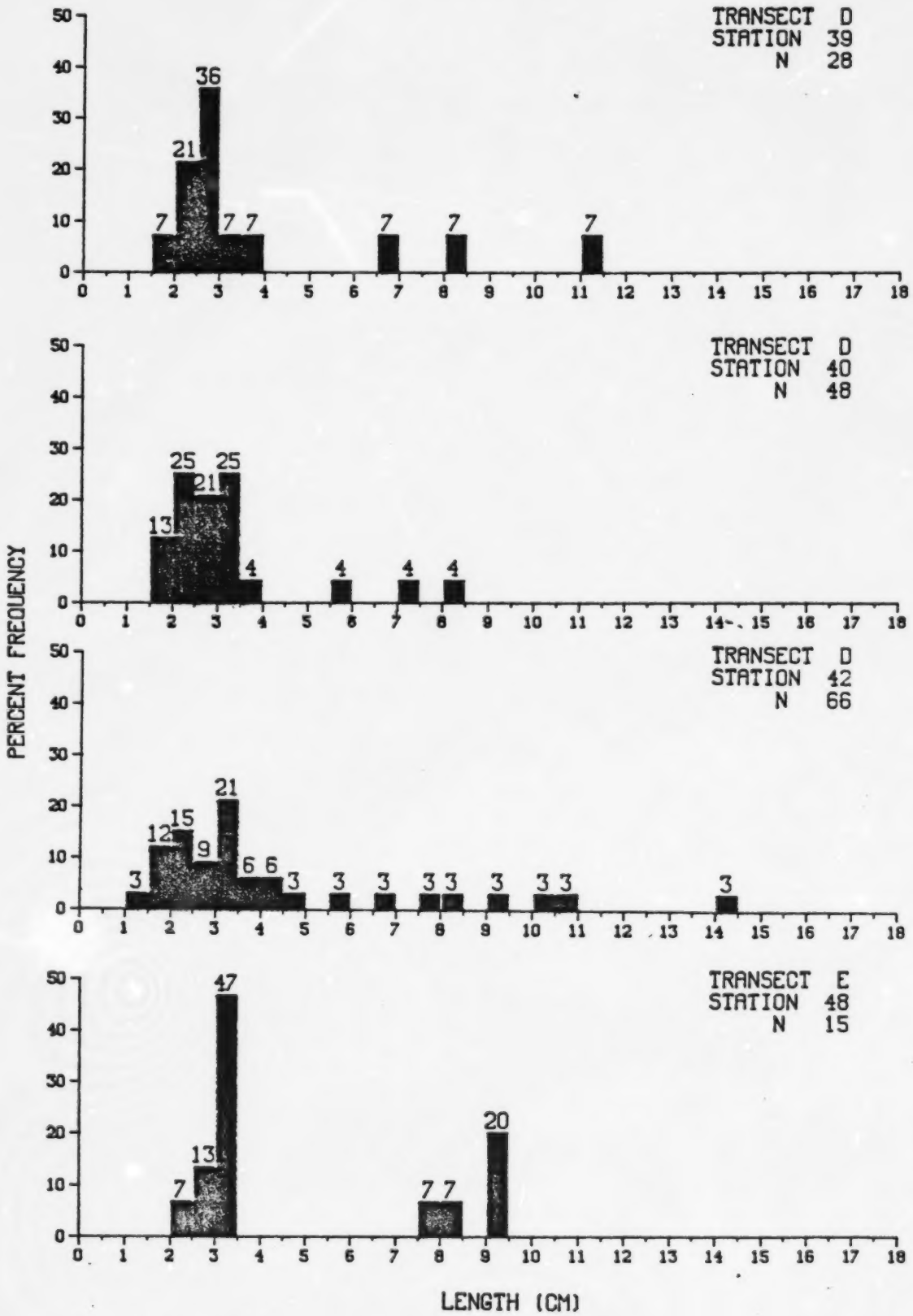

Figure 6. Cont'd.

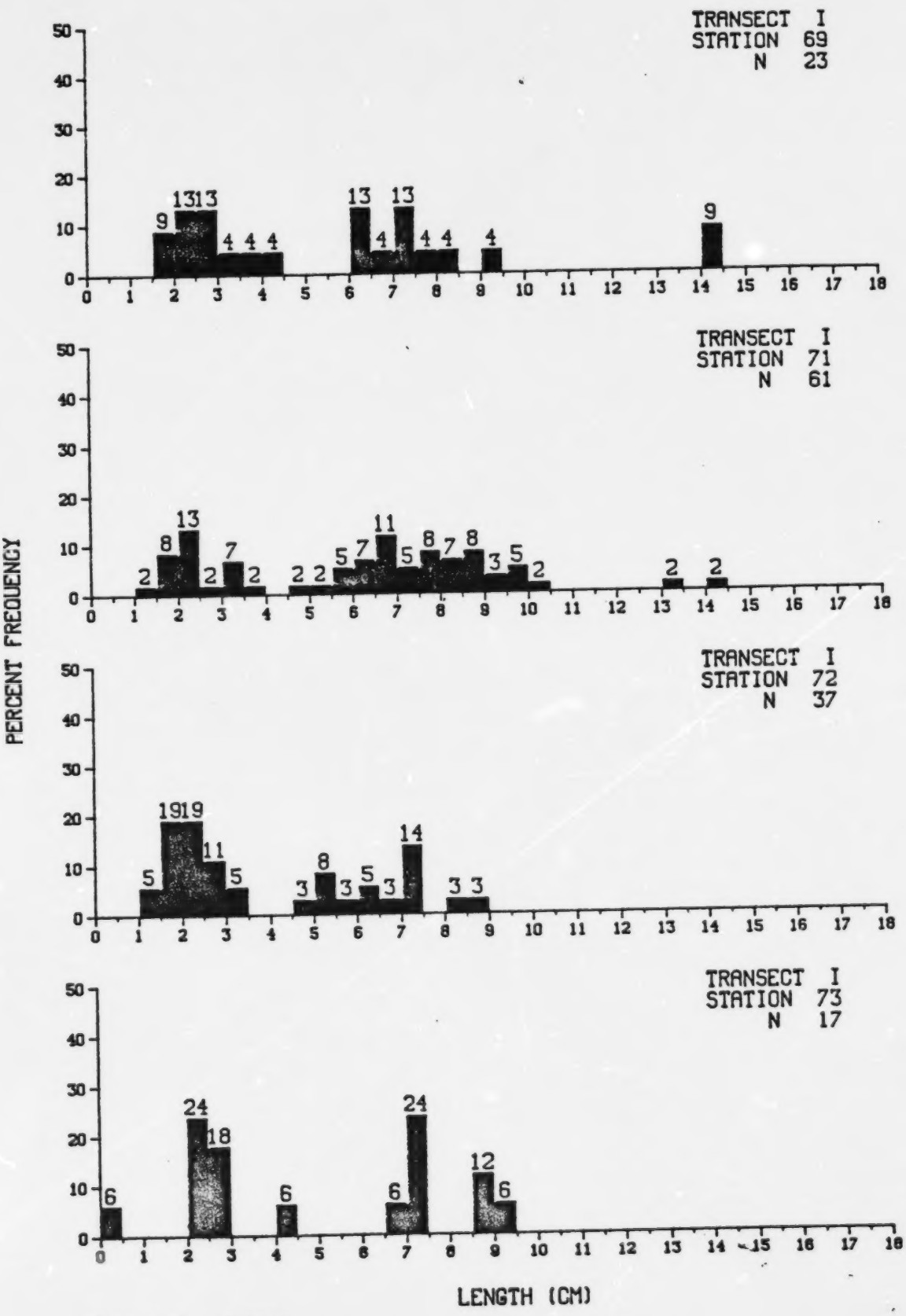

Figure 6. Cont'd.

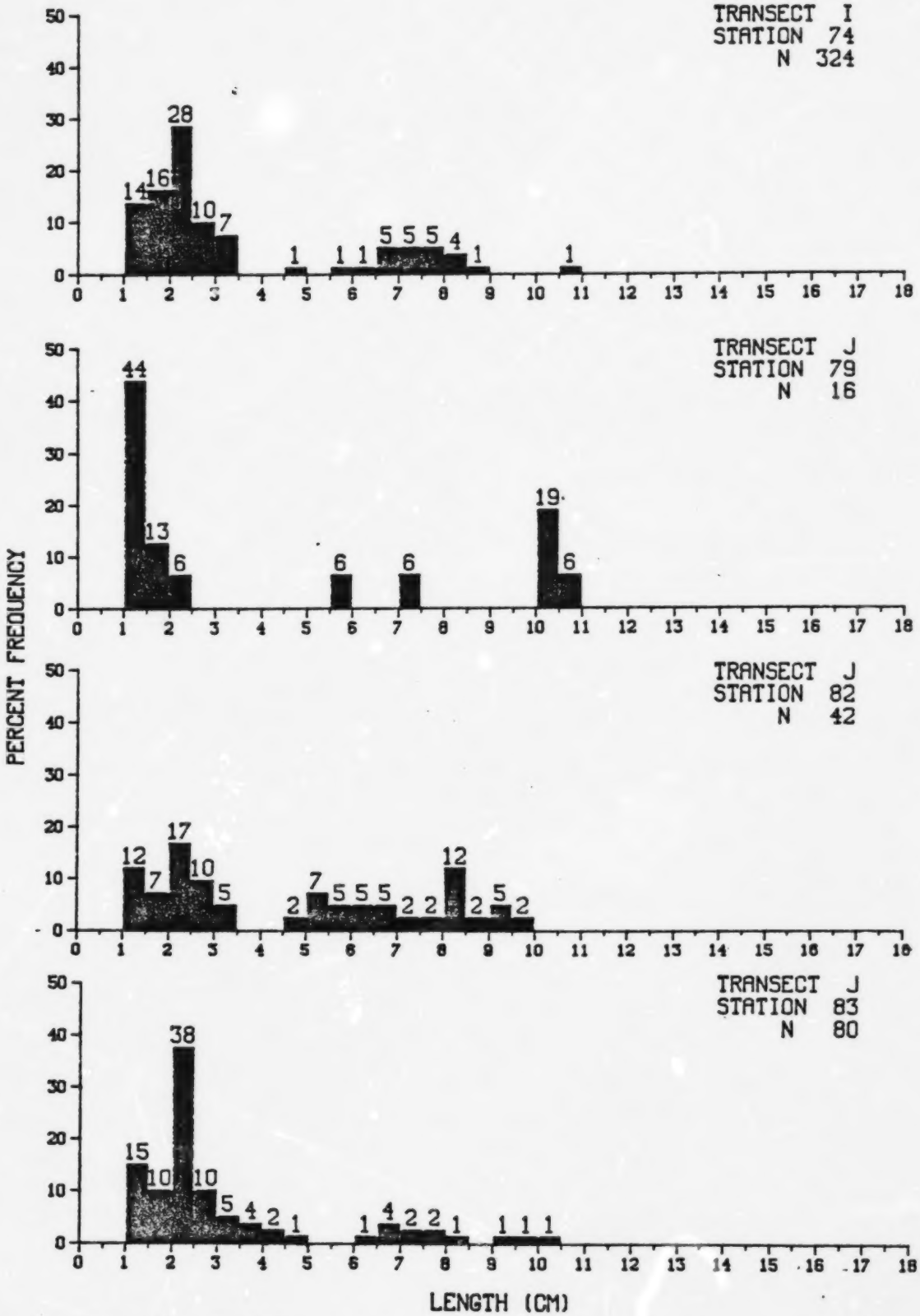

Figure 6. Cont'd.

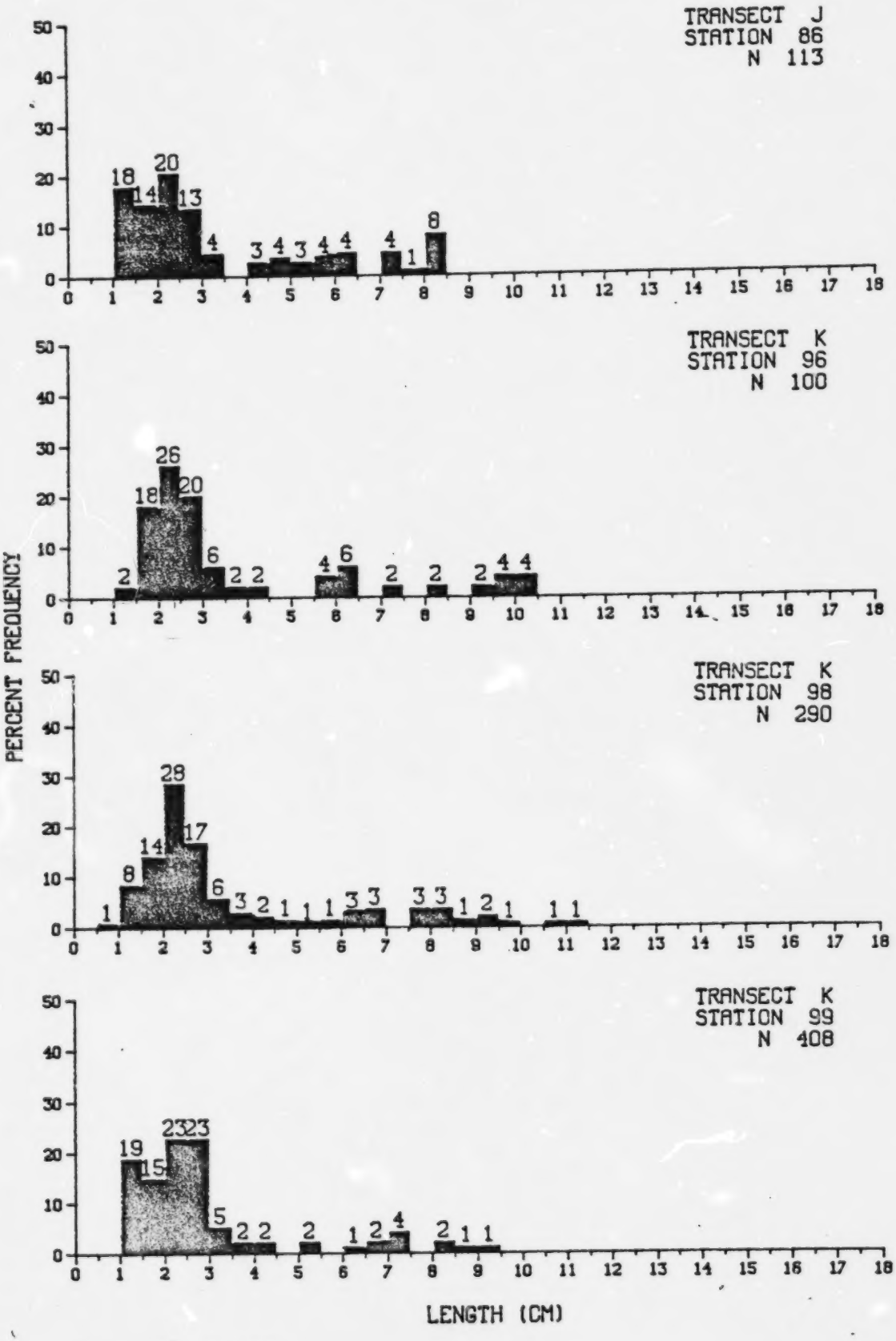

Figure 6. Cont'd.

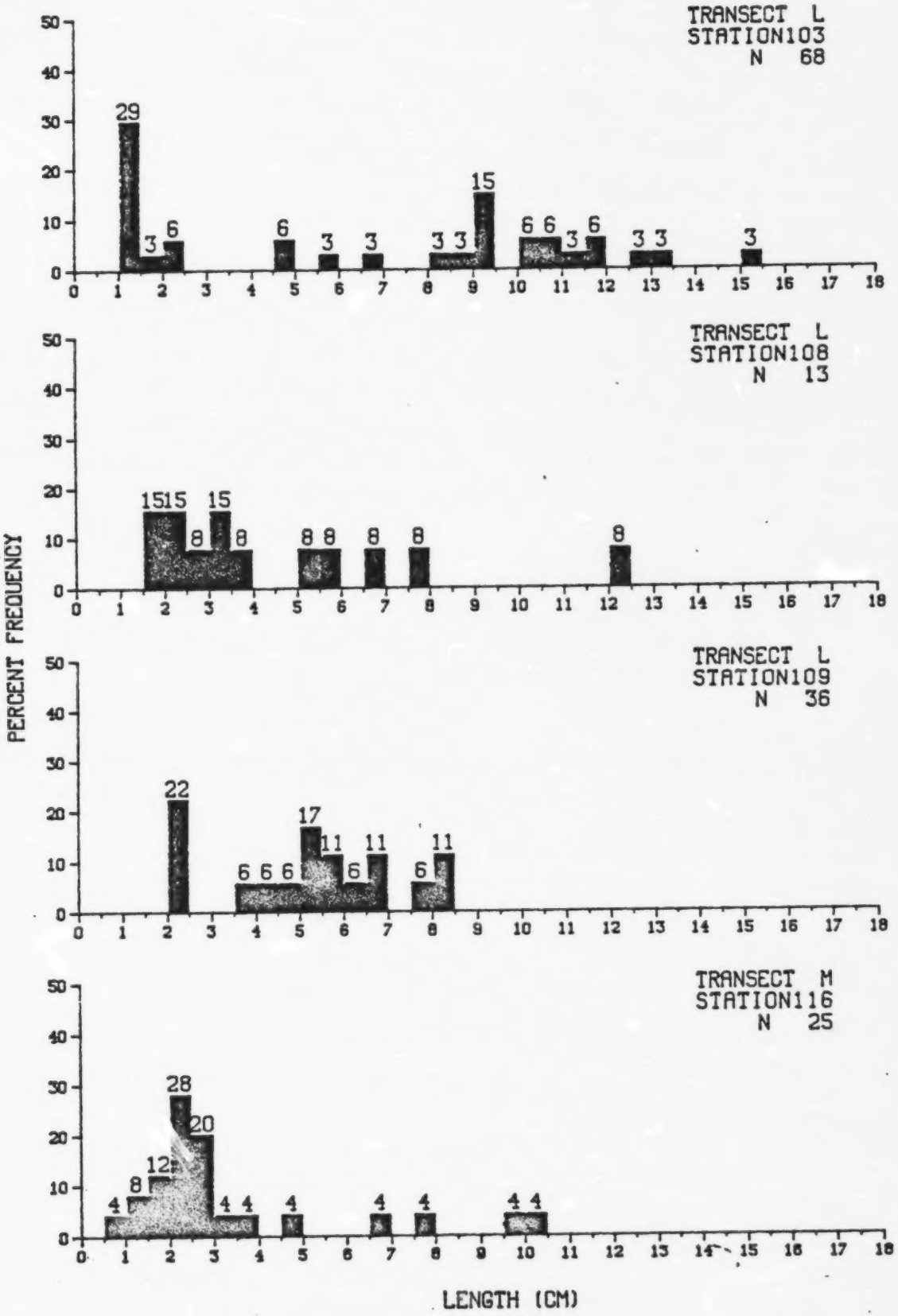

Figure 6. Cont'd.

Appendix. Composition, by weight, of material collected at each station.

Transect Line: A Station No.: 1

Wet Weight of Shell and Live Invertebrates	0.28 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.25 kg
Wet Weight of Oysters	0.03 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: A Station No.: 2

Wet Weight of Shell and Live Invertebrates	0.58 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.53 kg
Wet Weight of Oysters	0.05 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: A Station No.: 3

Wet Weight of Shell and Live Invertebrates	0.97 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.92 kg
Wet Weight of Oysters	0.05 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: A Station No.: 4

Wet Weight of Shell and Live Invertebrates	0.94 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.91 kg
Wet Weight of Oysters	0.03 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: A Station No.: 5

Wet Weight of Shell and Live Invertebrates	1.63 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.25 kg
Wet Weight of Oysters	0.38 kg
Wet Weight of Other Invertebrates.	0 kg

Transect Line: A Station No.: 6

Wet Weight of Shell and Live Invertebrates	3.47 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	2.55 kg
Wet Weight of Oysters	0.92 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: A Station No.: 7 - No catch.

Transect Line: A Station No.: 8 - No catch.

Transect Line: A Station No.: 9

Wet Weight of Shell and Live Invertebrates	1.14 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.93 kg
Wet Weight of Oysters	0.21 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: A Station No.: 10 - No catch.

Transect Line: A Station No.: 11 - No catch.

Transect Line: A Station No.: 12 - No catch.

Transect Line: B Station No.: 13

Wet Weight of Shell and Live Invertebrates	0.10 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.10 kg
Wet Weight of Oysters	0.00 kg.
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 14

Wet Weight of Shell and Live Invertebrates	0.95 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.53 kg
Wet Weight of Oysters	0.42 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 15

Wet Weight of Shell and Live Invertebrates	0.17 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.15 kg
Wet Weight of Oysters	0.02 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix 1. Cont'd.

Transect Line: B Station No.: 16

Wet Weight of Shell and Live Invertebrates	0.23 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.19 kg
Wet Weight of Oysters	0.04 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 17 - No catch.

Transect Line: B Station No.: 18

Wet Weight of Shell and Live Invertebrates	0.59 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.59 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 19 - No catch.

Transect Line: B Station No.: 20

Wet Weight of Shell and Live Invertebrates	1.98 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.75 kg
Wet Weight of Oysters	0.23 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 21

Wet Weight of Shell and Live Invertebrates	1.73 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.96 kg
Wet Weight of Oysters	0.77 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: B Station No.: 22

Wet Weight of Shell and Live Invertebrates	0 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.41 kg
Wet Weight of Oysters	0.29 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: B Station No.: 23

Wet Weight of Shell and Live Invertebrates	0	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	1.29	kg
Wet Weight of Oysters	0.22	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: B Station No.: 24

Wet Weight of Shell and Live Invertebrates	0	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.61	kg
Wet Weight of Oysters	0.04	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: B Station No.: 25 - No catch.

Transect Line: C Station No.: 26 - No catch.

Transect Line: C Station No.: 27

Wet Weight of Shell and Live Invertebrates	0.38	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.24	kg
Wet Weight of Oysters	0.14	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: C Station No.: 28

Wet Weight of Shell and Live Invertebrates	1.82	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	1.56	kg
Wet Weight of Oysters	0.26	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: C Station No.: 29

Wet Weight of Shell and Live Invertebrates	0.84	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.46	kg
Wet Weight of Oysters	0.38	kg
Wet Weight of Other Invertebrates	0	kg

...Cont'd.

Appendix. Cont'd.

Transect Line: C Station No.: 30

Wet Weight of Shell and Live Invertebrates	1.17 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.03 kg
Wet Weight of Oysters	0.14 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: C Station No.: 31

Wet Weight of Shell and Live Invertebrates	0.92 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.77 kg
Wet Weight of Oysters	0.15 kg
Wet Weight of Other Invertebrates.	0 kg

Transect Line: C Station No.: 32 - No catch.

Transect Line: C Station No.: 33

Wet Weight of Shell and Live Invertebrates	0.92 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.49 kg
Wet Weight of Oysters	0.43 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: C Station No.: 34

Wet Weight of Shell and Live Invertebrates	0.14 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.14 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates.	0 kg

Transect Line: C Station No.: 35 - No catch.

Transect Line: D Station No.: 36 - No catch.

Transect Line: D Station No.: 37

Wet Weight of Shell and Live Invertebrates	0.26 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.26 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: D Station No.: 38

Wet Weight of Shell and Live Invertebrates	1.53 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.08 kg
Wet Weight of Oysters	0.45 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: D Station No.: 39

Wet Weight of Shell and Live Invertebrates	1.39 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.20 kg
Wet Weight of Oysters	0.19 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: D Station No.: 40

Wet Weight of Shell and Live Invertebrates	1.19 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.94 kg
Wet Weight of Oysters	0.25 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: D Station No.: 41

Wet Weight of Shell and Live Invertebrates	0.62 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.62 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: D Station No.: 42

Wet Weight of Shell and Live Invertebrates	0.90 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.46 kg
Wet Weight of Oysters	0.44 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: D Station No.: 43

Wet Weight of Shell and Live Invertebrates	0.34 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.33 kg
Wet Weight of Oysters	0.01 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: E Station No.: 44 - No catch.

Transect Line: E Station No.: 45 - No catch.

Transect Line: E Station No.: 46 - No catch.

Transect Line: E Station No.: 47 - No catch.

Transect Line: E Station No.: 48

Wet Weight of Shell and Live Invertebrates	0.96	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.66	kg
Wet Weight of Oysters.	0.30	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: E Station No.: 49

Wet Weight of Shell and Live Invertebrates	0.81	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.78	kg
Wet Weight of Oysters	0.03	kg
Wet Weight of Other Invertebrates	0	kg

Transect Line: E Station No.: 50 - No catch.

Transect Line: E Station No.: 51 - No catch.

Transect Line: E Station No.: 52

Wet Weight of Shell and Live Invertebrates	0.46	kg
Wet Weight of Oyster Shell	0	kg
Wet Weight of Other Shell	0.40	kg
Wet Weight of Oysters	0.06	kg
Wet Weight of Other Invertebrates.	0	kg

Transect Line: E Station No.: 53 - No catch.

Transect Line: E Station No.: 54 - No catch.

Transect Line: F Station No.: 55 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line: F Station No.: 56 - No catch.

Transect Line: F Station No.: 57 - No catch.

Transect Line: F Station No.: 58 - No catch.

Transect Line: G Station No.: 59 - No catch.

Transect Line: G Station No.: 60 - No catch.

Transect Line: G Station No.: 61

Wet Weight of Shell and Live Invertebrates	1.23 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.21 kg
Wet Weight of Oysters	0.02 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: G Station No.: 62 - No catch.

Transect Line: H Station No.: 63 - No catch.

Transect Line: H Station No.: 64 - No catch.

Transect Line: H Station No.: 65 - No catch.

Transect Line: H Station No.: 66 - No catch.

Transect Line: I Station No.: 67

Wet Weight of Shell and Live Invertebrates	0.06 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.05 kg
Wet Weight of Oysters	0.01 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: I Station No.: 68

Wet Weight of Shell and Live Invertebrates	0.26 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.25 kg
Wet Weight of Oysters	0.01 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 69

Wet Weight of Shell and Live Invertebrates	1.42 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.82 kg
Wet Weight of Oysters	0.60 kg
Wet Weight of Other Invertebrates.	0 kg

Transect Line: I Station No.: 70

Wet Weight of Shell and Live Invertebrates	0.33 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.33 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 71

Wet Weight of Shell and Live Invertebrates	4.35 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	2.44 kg
Wet Weight of Oysters	1.81 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 72

Wet Weight of Shell and Live Invertebrates	2.60 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.00 kg
Wet Weight of Oysters	0.60 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 73

Wet Weight of Shell and Live Invertebrates	1.45 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.13 kg
Wet Weight of Oysters	0.32 kg
Wet Weight of Other Invertebrates.	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: I Station No.: 74

Wet Weight of Shell and Live Invertebrates	2.44 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.61 kg
Wet Weight of Oysters	0.83 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 75 - No catch.

Transect Line: I Station No.: 76

Live Invertebrates	0.13 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.13 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: I Station No.: 77 - No catch.

Transect Line: B Station No.: 78 - No catch.

Transect Line: J Station No.: 79

Wet Weight of Shell and Live Invertebrates	0.39 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.17 kg
Wet Weight of Oysters	0.22 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 80

Wet Weight of Shell and Live Invertebrates	0.31 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.31 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 81

Wet Weight of Shell and Live Invertebrates	0.68 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.38 kg
Wet Weight of Oysters	0.30 kg
Wet Weight of Other Invertebrates	0 kg

...Cont'd.

Appendix. Cont'd.

Transect Line: J Station No.: 82

Wet Weight of Shell and Live Invertebrates	1.20 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.35 kg
Wet Weight of Oysters	0.85 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 83

Wet Weight of Shell and Live Invertebrates	2.90 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	2.06 kg
Wet Weight of Oysters	0.84 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 84 - No catch.

Transect Line: J Station No.: 85 - No catch.

Transect Line: J Station No.: 86

Wet Weight of Shell and Live Invertebrates	2.36 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.56 kg
Wet Weight of Oysters	0.80 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 87

Wet Weight of Shell and Live Invertebrates	0.92 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.74 kg
Wet Weight of Oysters	0.18 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: J Station No.: 88 - No catch.

Transect Line: J Station No.: 89 - No catch.

Transect Line: J Station No.: 90 - No catch.

Transect Line: K Station No.: 91 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line: K Station No.: 92

Wet Weight of Shell and Live Invertebrates	0.26 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.20 kg
Wet Weight of Oysters	0.06 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 93

Wet Weight of Shell and Live Invertebrates	0.68 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.52 kg
Wet Weight of Oysters	0.16 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 94

Wet Weight of Shell and Live Invertebrates	0.71 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.33 kg
Wet Weight of Oysters	0.38 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 95

Wet Weight of Shell and Live Invertebrates	0.99 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.84 kg
Wet Weight of Oysters	0.15 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 96

Wet Weight of Shell and Live Invertebrates	1.71 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.88 kg
Wet Weight of Oysters	0.83 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 97 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line: K Station No.: 98

Wet Weight of Shell and Live Invertebrates	2.05 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.58 kg
Wet Weight of Oysters	1.47 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 99

Wet Weight of Shell and Live Invertebrates	1.48 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.73 kg
Wet Weight of Oysters	0.75 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: K Station No.: 100 - No catch.

Transect Line: K Station No.: 101 - No catch.

Transect Line: L Station No.: 102 - No catch.

Transect Line: L Station No.: 103

Wet Weight of Shell and Live Invertebrates	1.96 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.56 kg
Wet Weight of Oysters	1.40 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 104

Wet Weight of Shell and Live Invertebrates	0.33 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.33 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 105 - No catch.

Transect Line: L Station No.: 106 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line: L Station No.: 107

Wet Weight of Shell and Live Invertebrates	0.74 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.56 kg
Wet Weight of Oysters	0.18 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 108

Wet Weight of Shell and Live Invertebrates	1.02 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.70 kg
Wet Weight of Oysters	0.32 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 109

Wet Weight of Shell and Live Invertebrates	1.60 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	1.59 kg
Wet Weight of Oysters	0.01 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 110

Wet Weight of Shell and Live Invertebrates	0.72 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.29 kg
Wet Weight of Oysters	0.00 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: L Station No.: 111 - No catch.

Transect Line: L Station No.: 112 - No catch.

Transect Line: M Station No.: 113 - No catch.

Transect Line: M Station No.: 114 - No catch.

Transect Line: M Station No.: 115 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line: M Station No.: 116

Wet Weight of Shell and Live Invertebrates	0.78 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.38 kg
Wet Weight of Oysters	0.40 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: M Station No.: 117 - No catch.

Transect Line: M Station No.: 118 - No catch.

Transect Line: M Station No.: 119 - No catch.

Transect Line: M Station No.: 120 - No catch.

Transect Line: M Station No.: 121 - No catch.

Transect Line: M Station No.: 122

Wet Weight of Shell and Live Invertebrates	0.07 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.07 kg
Wet Weight of Oysters	0 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: M Station No.: 123

Wet Weight of Shell and Live Invertebrates	0.30 kg
Wet Weight of Oyster Shell	0 kg
Wet Weight of Other Shell	0.15 Kg
Wet Weight of Oysters	0.15 kg
Wet Weight of Other Invertebrates	0 kg

Transect Line: N Station No.: 124 - No catch.

Transect Line: N Station No.: 125 - No catch.

Transect Line: N Station No.: 126 - No catch.

...Cont'd.

Appendix. Cont'd.

Transect Line:	N	Station No.:	127 - No catch.
Transect Line:	N	Station No.:	128 - No catch.
Transect Line:	N	Station No.:	129 - No catch.
Transect Line:	N	Station No.:	130 - No catch.
Transect Line:	N	Station No.:	131 - No catch.